

Borehole

10-04-04**Log Event A****Borehole Information**

Farm : <u>A</u>	Tank : <u>A-104</u>	Site Number : <u>299-E25-56</u>
N-Coord : <u>41,283</u>	W-Coord : <u>47,753</u>	TOC Elevation : <u>688 est.</u>
Water Level, ft :	Date Drilled : <u>5/30/1955</u>	

Casing Record

Type : <u>Steel-welded</u>	Thickness, in. : <u>0.322</u>	ID, in. : <u>8</u>
Top Depth, ft. : <u>0</u>	Bottom Depth, ft. : <u>150</u>	

Borehole Notes:

This borehole was originally drilled in May 1955 and completed to a depth of 151 ft using 8-in.-diameter casing. There is no indication in the driller's log or Chamness and Merz (1993) that the borehole was perforated or grouted. This borehole was not deepened.

It is assumed the casing thickness is 0.322 in., on the basis of the published thickness for schedule-40, 8-in. pipe.

The top of the casing is the zero reference for the SGLS. The casing lip is located approximately 0.5 ft below the ground surface in a barrel that protects the borehole from being covered by gravel. Apparently, a length of casing was added to the top of the borehole sometime after the completion in 1955. There is a surface elevation discrepancy between Chamness and Merz (1993), other borehole elevations, and surface observations made in the tank farm. From the field, the logging engineers report the tank farm surface is mostly flat with a few berm mounds running between the tanks. Surface elevations reported for other boreholes surrounding this tank fall between 688 and 689 ft. The surface elevation for the Number 1 leak detection caisson is 690 ft (H-Drawing). However, the surface elevation listed in Chamness and Merz (1993) is 683 ft. Assuming that the collar elevation was measured shortly after the borehole was constructed, it is apparent that about 5 ft of gravel cover was added to the tank farm surface between 1956 and 1961 before the other boreholes were installed. For this report, the surface elevation is estimated to be 688 ft.

Equipment Information

Logging System : <u>1</u>	Detector Type : <u>HPGe</u>	Detector Efficiency: <u>35.0 %</u>
Calibration Date : <u>04/1996</u>	Calibration Reference : <u>GJPO-HAN-5</u>	Logging Procedure : <u>P-GJPO-1783</u>

Logging Information

Log Run Number : <u>1</u>	Log Run Date : <u>09/19/1996</u>	Logging Engineer: <u>Alan Pearson</u>
Start Depth, ft.: <u>0.0</u>	Counting Time, sec.: <u>100</u>	L/R : <u>L</u> Shield : <u>N</u>
Finish Depth, ft. : <u>6.0</u>	MSA Interval, ft. : <u>0.5</u>	Log Speed, ft/min.: <u>n/a</u>

Borehole

10-04-04**Log Event A**

Log Run Number :	<u>2</u>	Log Run Date :	<u>09/19/1996</u>	Logging Engineer:	<u>Alan Pearson</u>
Start Depth, ft.:	<u>148.0</u>	Counting Time, sec.:	<u>100</u>	L/R : <u>L</u>	Shield : <u>N</u>
Finish Depth, ft. :	<u>73.0</u>	MSA Interval, ft. :	<u>0.5</u>	Log Speed, ft/min.:	<u>n/a</u>

Log Run Number :	<u>3</u>	Log Run Date :	<u>09/23/1996</u>	Logging Engineer:	<u>Alan Pearson</u>
Start Depth, ft.:	<u>74.0</u>	Counting Time, sec.:	<u>100</u>	L/R : <u>L</u>	Shield : <u>N</u>
Finish Depth, ft. :	<u>5.0</u>	MSA Interval, ft. :	<u>0.5</u>	Log Speed, ft/min.:	<u>n/a</u>

Logging Operation Notes:

This borehole was logged in three log runs. The total logging depth achieved by the SGLS was 148 ft.

Analysis Information

Analyst : R.R. SpatzData Processing Reference : MAC-VZCP 1.7.9Analysis Date : 03/24/1998**Analysis Notes :**

The pre- and post-survey field verification spectra for all logging runs met the acceptance criteria established for peak shape and system efficiency. The energy calibration and peak-shape calibration from these spectra were used to establish the peak resolution and channel-to-energy parameters used in processing the spectra acquired during the logging.

A casing correction factor for 0.330-in.-thick casing was applied to the log data during the analysis process.

Shape factor analysis was applied to the SGLS data. Insights are provided into the distribution of radionuclide contaminants and into the nature of zones of elevated gamma-ray activity not attributable to gamma-emitting radionuclides.

Log Plot Notes:

Separate log plots show the man-made and the naturally occurring radionuclides. The natural radionuclides can be used for lithology interpretations. The headings of the plots identify the specific gamma rays used to calculate the concentrations. Uncertainty bars on the plots show the statistical uncertainties for the measurements as 95-percent confidence intervals. Open circles on the plots give the MDL. The MDL of a radionuclide represents the lowest concentration at which positive identification of a gamma-ray peak is statistically defensible.

A combination plot includes the man-made and natural radionuclides, the total gamma derived from the spectral data, and the Tank Farms gross gamma log. The gross gamma plot displays the latest available digital data. No attempt has been made to adjust the depths of the gross gamma logs to coincide with the SGLS data.

A plot of the shape factor analysis results is also included. The plot is used as an interpretive tool to help determine the radial distribution of man-made contaminants around the borehole.



Borehole

10-04-04

Log Event A

Results/Interpretations:

The man-made radionuclides detected around this borehole were Cs-137 and Eu-154. Cs-137 contamination was detected continuously from the ground surface to 6.5 ft at concentrations ranging from 0.5 to 20 pCi/g. The maximum Cs-137 concentration was 20 pCi/g at 1 ft. Cs-137 contamination was also detected at the bottom of the borehole (148 ft) at about 0.6 pCi/g.

Eu-154 contamination was detected continuously from depths of 4.5 to 6.5 ft at concentrations less than 1 pCi/g.

The K-40 concentrations decrease at 23 ft from a general background of about 16 pCi/g above this depth to about 13 pCi/g between 23 and 85 ft. Below 85 ft, the K-40 concentrations increase to a general background of about 18 pCi/g and remain fairly constant to the bottom of the borehole (125.5 ft). The concentrations of U-238 and Th-232 increase below 85 ft.